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ABSTRACT

Viewed as discourse, official forms exhibit identifiable text characteristics and elicit strategies for comprehension that take into account these characteristics, as well as context and the user's prior knowledge about the world. However, forms also have unique characteristics that require processes and strategies which differ in systematic ways from those needed for conventional texts. Protocol analysis has revealed that expert form users operate on several levels as they try to understand and complete a form. The lowest level is represented by decoding statements, indicating that the user was devoting attention to the lexical and syntactic aspects of directions in order to figure out word meanings and to clarify sentences. The second level, form-using strategies, represents text-level processes for understanding in which the user goes beyond words and sentences in attempting to relate items across the form or to draw on personal knowledge to clarify the meanings of items. The third level, metacomments, reflects the global strategies that arise as the reader puts the document in a societal and institutional context. The preliminary results of protocol studies indicate that the comments of the expert form user are far more likely to reflect the higher two levels of strategies than are the comments of the novice form user. Results of these studies can be used to design forms to facilitate the use of higher level strategies and to exhibit more explicitly the discourse features--cohesive devices, scenarios, instantiation--to which successful form users attend. (HOD)

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DOCUMENT DESIGN PROJECT

Technical Report No. 13

Strategies for Understanding Forms and Other Public Documents

V. Melissa Holland
Janice C. Redish

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ABOUT THE DOCUMENT DESIGN PROJECT

In September 1978, the American Institutes for Research (AIR) began the Document Design Project to foster clear and simple writing and design of public documents. The purpose of the Document Design Project (DDP) is to help make forms, regulations, brochures, and other written materials easier for people to read, to understand, and to use.

Carnegie-Mellon University and Siegel & Gale, Inc., a private firm that specializes in language simplification and language training, work with AIR on this project. Funding for the project comes from the National Institute of Education.

The Project's goal is to increase the knowledge and skills of people who produce public documents. To accomplish this goal, the Document Design Project is working on three tasks:

Task 1: To conduct theoretical and applied research studies on language comprehension, on the ways in which skilled and unskilled writers work, on problems associated with different document features.

Task 2: To work directly with government and private agencies as they produce materials for public use.

Task 3: To develop courses on writing and design for graduate students and undergraduates.

If you have questions or comments on this report or on other work of the Document Design Project, contact Dr. Janice C. Redish, Director, The Document Design Project, AIR, (202) 342-5071.

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STRATEGIES FOR UNDERSTANDING FORMS - AND OTHER PUBLIC DOCUMENTS*

Since 1978, we and our colleagues in the Document Design Center at the American Institutes for Research have been studying the problems that people have in understanding and using public documents. Our interest ranges across a wide variety of documents--for example, legal contracts, insurance policies, warranties, regulations, instructions for forms, and the forms themselves. In this paper, we are concerned with forms as discourse: How are forms similar to other types of text? How do they differ? How can we best study forms as a type of text? What have we learned in our work so far?

From other studies that we have done, we have both objective and subjective evidence of how critical forms are in people's lives and of how much difficulty people have in dealing with them. Forms, it would seem, are an important document type to study; yet there is very little research on forms. Our interest in conducting this research is threefold. Based on research, we can

- help writers and designers improve forms so that they better fit the skills and strategies of the target audience;
- help educators to improve the skills and strategies of students who will have to use these forms; and

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- add to linguists' and psychologists' understanding of how people process written material.

A model for reading forms and other functional documents

Documents have pragmatic contexts and immediate consequences that the more traditionally studied texts may not have. Reading a document is a functional necessity for the reader; documents usually require immediate action rather than long-term memory storage. We, therefore, use the term "functional reading" to contrast document-reading with reading for pleasure (stories) and reading to learn (expository prose).

The model pictured on the next page is an illustration of some of the factors we see as critical to understanding "functional reading."* As the model shows, successful use of a document is an interaction between the document's characteristics and the user's characteristics as they each influence the user's behavior. The user employs strategies and processes to make sense of the document and to fulfill the required tasks. We propose that by viewing forms as discourse, we can stimulate a productive line of research--that is, we will find that forms exhibit identifiable text characteristics and elicit strategies for comprehension that call on these characteristics, on context, and on the user's prior knowledge about the world--as do other types of text. We further propose that simply carrying over what we know about other types of text will not

*The model shown here is a refinement of an earlier model developed by Robbin Battison and Melissa Holland of the Document Design Center. Brown, Campione, and Day (1981) have recently presented a similar model for thinking about problems that students have in learning from instructional text.

Critical Aspects of Functional Reading

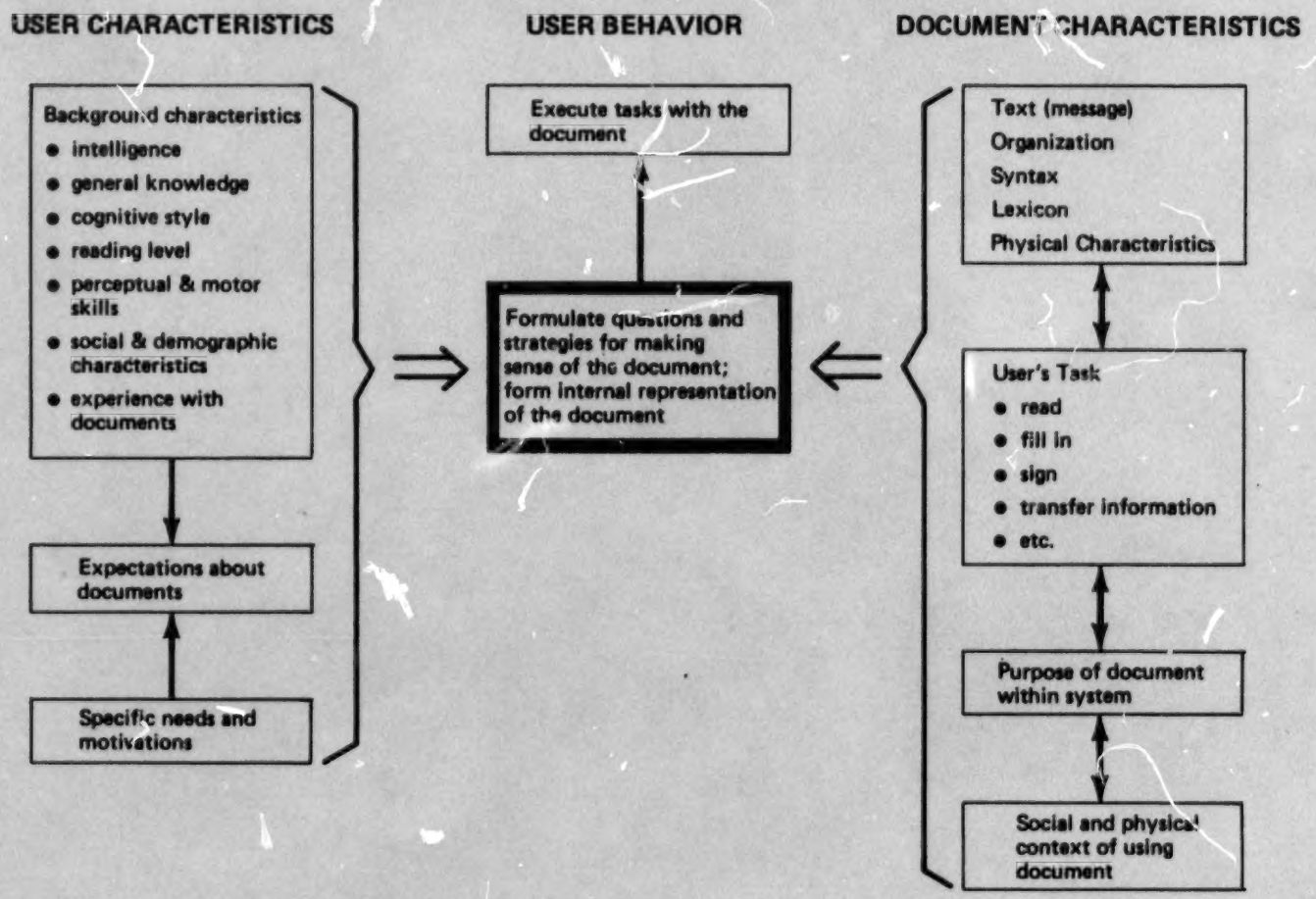

FIGURE 1

DOCUMENT DESIGN CENTER

be sufficient to understand forms--that is, we will find that forms have unique characteristics and that they require processes and strategies which differ in systematic ways from those needed to understand stories or textbooks.

We want, however, to bring previous research to bear on our studies of forms as discourse. What is this research?

What has research on other text types shown us?

Linguists analyzing discourse have found a range of variables that serve as distinct levels in the description of stories, expository prose, and the more traditional forms of text. Psychologists studying text comprehension and memory have found that these variables are robust predictors of readers' performance. These variables include:

- cohesion--the ties between sentences identifiable in surface structure such as ellipsis, anaphora, word repetition (Kintsch 1974, Grimes 1975, Halliday & Hasan 1976);
- message structure (staging)--the patterning of information in sentence sequences by theme-rheme or given-new relationships (Halliday 1967, Chafe 1970, Grimes 1975, Clark & Haviland 1977);
- rhetorical predicates or coherence relations--the deeper logical and semantic connections between sentences (Grimes 1975, Meyer 1975, Hobbs 1979);
- text structure--the overall organizational form, depending on the text type or genre (van Dijk 1972, 1980, Kintsch & van Dijk 1978). Grammars have been formulated to characterize the structures of texts that fit highly stereotyped cultural norms, e.g.,simple stories (Rumelhart 1975, Mandler & Johnson 1977, Stein & Glenn 1979). For example, Adams and Collins (1979) suggest that, to interpret a simple tale as a fable, the reader must have a schema for fable specifying that some statement will be interpreted as a moral.

- content or message base--the level that draws on world knowledge, such as is represented in scripts (Shank & Abelson 1977) and frames (Minsky 1975). Scripts represent people's knowledge about frequently-encountered episodes with predictable participants and scenes (for example, a restaurant script). Knowledge frames define elements and relationships in more static arrays. At the very least, the presented text, in order to be understood, must engage some part of the reader's prior knowledge about the world (Bransford & Johnson 1973, Bransford & McCarrell, 1974). And this knowledge, as revealed by work in artificial intelligence, semantic memory, and discourse comprehension, appears to be organized into richly structured, global configurations--not only scripts and frames, but looser, abstract, and more flexible structures known as "schemas" (Anderson 1977) (a distinction drawn by Winograd 1977 and developed by Rumelhart and Ortony 1977).

  Tannen's work (1979) on frames in the discourse of oral reporting fits here also; it conforms to what we might call dynamic schemas. Tannen's work shows that we can operate on several complex and subtly distinct levels at once--from adopting a general rhetorical frame (subject-of-the experiment vs. telling-a-story) to frames for interpreting content.

- the cooperative contract--a pragmatic convention described by Grice (1975) in which speaker and hearer (or writer and reader) enter into a tacit agreement to cooperate, and to each assume that the other is cooperating, toward the purpose of communicating. Cooperating, according to Grice, means being relevant, clear, truthful, and informative. This contract underlies all discourse. As we will show later, one of the problems that unsuccessful forms users have is that they do not assume the forms designer had a communicative intent.

This very productive work needs to be expanded in two ways--one is to see how these variables affect performance with other text types beyond expository prose and stories; the other is to delve deeply and more directly into the box in our model labelled strategies or processes. We are exploring both of these directions with application forms.

Forms as discourse--textual analysis

It might be objected that forms are not text. After all, they typically consist of numbered, fill-in-the-blank items rather than complete sentences in a linear flow. The connections between items appear to be largely procedural rather than logico-semantic or rhetorical. And the cognitive result of using a form is not the construction of an internal text base, or macrostructure, as Kintsch and van Dijk (1978) have posited as the product of reading prose.

However, work indicates that forms do display properties of connected prose, although the connections are looser and sparser than in more traditional text. (On the continuum suggested by Halliday and Hasan, 1976, forms would fall somewhere between an index and a narrative.) We have both analytical and empirical indications that forms are text. That is, the indications can be seen in the document itself and in the behavior of document users.

We have discussed analytical evidence that forms are text in other papers (Charrow, Holland, Peck & Shelton 1980; Holland 1980, 1981; Campbell & Holland forthcoming). Therefore, we will only briefly review some of this evidence here. To do so, let us consider the Medicaid form shown on the following two pages.

Like most forms, this one displays cohesion by using word repetition and anaphora. As an example of repetition, note that terms like "family" and "family member" have special meanings defined in the form. You can see these terms in the heading of the box on the front of the form. They are repeated throughout the

BEFORE

DHR 1369

GOVERNMENT OF THE DISTRICT OF COLUMBIA
DEPT. OF HUMAN RESOURCES

RECERTIFICATION FOR MEDICAL ASSISTANCE

DATE: [illegible]

CENSUS TRACT:

SERVICE AREA:

D. C. I. D. NO:

UPON RETURN SEND TO:

DOE, ELLEN, CET.
(MEDICAID)
DEPARTMENT OF HUMAN RESOURCES
800 FIRST ST. N.E.
WASHINGTON, DC 20001

IMPORTANT YOUR ELIGIBILITY FOR MEDICAL ASSISTANCE EXPIRES ON [illegible] 19[illegible] FEDICARE NO. [illegible]

PLEASE COMPLETE THIS FORM and return it before your Medical Assistance Card expires. If you don't we will not know if you continue to be eligible, and we will be required to take action to end your medical assistance. The information you give must be TRUE AND COMPLETE. It will be verified. You will be asked to furnish proof of information given. Those persons found to have given false information may be fined up to $500 or imprisoned for up to one year, or both.

If this form is not returned completed within 15 days your eligibility for Medical Assistance will terminate.

PLEASE PRINT CLEARLY. ANSWER ALL QUESTIONS ON BOTH SIDES OF THIS FORM. WHEN THE FORM IS COMPLETED AND SIGNED, RETURN IT IN ENCLOSED ENVELOPE. IF YOU HAVE ANY DIFFICULTIES FILLING OUT THIS FORM CALL 724-5174.

IMPORTANT: 1. Please attach 3 recent payment statements. 2. All income must be listed and verified, including children that are not in school. 3. If you are unemployed, send verification from person that supports you.

1. FAMILY MEMBERS (LIVING WITH YOU AND USING A MEDICAID CARD)						TELEPHONE NUMBERS HOME		RELATION TO YOU
LAST NAME	FIRST NAME	MI	DATE OF BIRTH	SEX	INS. CODE	SOCIAL SECURITY NO.	INDIVIDUAL DCID NO.	

IF SOME FAMILY MEMBERS LISTED ABOVE HAVE LEFT THE HOME, PLEASE CROSS OUT THEIR NAMES. CHECK THIS COLUMN IF RECVING WELFARE ▲

LIST ANY NEW FAMILY MEMBERS IN THIS SHADED AREA AND ATTACH BIRTH CERTIFICATES.

LIST NAME OF ANY FAMILY MEMBER WHO IS DISABLED OR BLIND:

2. WRITE IN NEW ADDRESS IF YOU HAVE MOVED: STREET: _____ CITY: _____ APT. NO. _____ STATE: _____ ZIP CODE: _____

3. Does the spouse of any person listed above live outside the family? ☐ YES ☐ NO

If yes, give name and address: _____

Write in the amount that he (she) gives toward your support each month $

4. Does parent(s) of any minor children listed above live at a different address? ☐ YES ☐ NO

If yes, give name and address:

Write in the amount that he (she) gives toward their support per month: $

NOW FILL IN BACK OF THIS FORM

BEFORE page 2 of 2 pages

5. INCOME FROM WORK

A. Name of person working _____
Income Before Deductions: Weekly: $_____ Bi-Wkly: $_____ Monthly $_____
Employers Name and Address: _____

AMOUNT TAKEN OUT (deductions)	EXPENSES	
$_____ Federal Tax	$_____	Transportation (Daily)
$_____ D. C. Tax	$_____	Child Care (Weekly)
$_____ Social Security	$_____	Other (Explain)
$_____ Retirement		Example: Uniforms,
$_____ Bonds & Credit Union		Support payments, etc.

B. Name of person working _____
Income Before Deductions: Weekly: $_____ Bi-Wkly: $_____ Monthly $_____
Employers Name and Address: _____

AMOUNT TAKEN OUT (deductions)	EXPENSES	
$_____ Federal Tax	$_____	Transportation (Daily)
$_____ D. C. Tax	$_____	Child Care (Weekly)
$_____ Social Security	$_____	Other (Explain)
$_____ Retirement		Example: Uniforms,
$_____ Bonds & Credit Union		Support Payments, etc.

6. OTHER INCOME: Do any family members living with you and having a medical assistance card receive income from the following:

	SOURCE	NAME OF PERSON RECEIVING INCOME	MONTHLY AMOUNT
	Social Security		$
	Civil Service Retirment		$
	V.A. Pension		$
	Military Retirement		$
	Railroad Retirement		$
	Rents of Property		$
	Interest from Stocks or Bonds		$
	Support from relatives or friends		$
	Other		$

7. RESOURCES:
(Name of Bank, Savings & Loan Association) _____
Cash on Hand . . . . . $_____
Money in Savings . . . . . $_____
Other resources such as Stocks, Bonds, etc. . . . . $_____
Real estate: (Other than Home in which we live) assessed value . . . . . $_____

8. INSURANCE

A. Life Insurance on the following persons: _____
Insurance Company _____ Policy No. _____ Date Issued _____
Cash Value $ _____ Face Value $ _____

B. Health Insurance on the following persons _____
And pay $ _____ (Circle one) Weekly Bi-Weekly Monthly Quarterly Insurance Company _____
Policy No. _____

C. Medicaid Information (age 65 and over, disabled or blind) with Red, White, Blue Card is any person listed in the family group living with you receiving Medicare? If so, indicate in the space provided below.
Claim No. _____ Person(s) covered _____ Kind of Coverage _____
_____ HIB _____ SMID
_____ HIB _____ SMID

D. List names of family members who have claim(s) pending for personal injury (For example: Auto accident or on the job injury)
_____ _____ _____ _____

DO NOT WRITE IN SHADED AREA

WORKER'S SSR CODE: _____
INSURANCE CODE: _____
9. CATEGORICALLY EXEMPT (Disregarded Income) ☐ OAA ☐ AB ☐ AFDC ☐ OTR
$ _____

10. EXEMPT RESOURCES _____
TOTAL RESOURCES _____
EXCESS RESOURCES _____

11. TOTAL LESS EXEMPTIONS _____
Less Health Ins. (6 months) _____
FAMILY ADJUSTED INCOME _____
INCOME SCALE _____
EXCESS INCOME _____
EXCESS INCOME (FROM 10) _____
EXCESS INCOME AND RESOURCES _____
Signature of Certifying Officer _____ Date: _____

12. I declare that, to the best of my knowledge and belief, the information on this application for Medical Assistance, is true, correct, and complete. I understand that I may be asked to bring proof of the information I gave or that a representative of the Bureau of Eligibility Determination may get in touch with me or visit my home to request such proof. I will report promptly any changes in my income, resources, family members, needs or address change to the Bureau of Eligibility Determination. I understand that receipt of Medical Assistance will be paid for from Federal and State (D.C.) funds, and that any false claims, statements, documents or incomplete information will be prosecuted under applicable Federal or State (D.C.) Laws.

13. _____ MONTH DAY YEAR _____ MONTH DAY YEAR
SIGNATURE OF APPLICANT OF "X MARK SIGNATURE OF HUSBAND/WIFE OR "X" MARK

14. SIGNATURE OF WITNESS TO "X" MARK ABOVE _____ MONTH YEAR YEAR
ADDRESS OF WITNESS: _____

15. Anyone who knowingly aids or encourages another person in obtaining or attempting to obtain Medical Assistance by giving false or incomplete information is punishable for fraud. He might be imprisioned, or both. (D.C. Code Section 3-216)

Signature of Applicants Guardian, or person who helped fill out _____ Month Day Year _____ Telephone Number
Street _____ Address _____ City _____ State _____ Zip Code _____ Relationship to Applicant

16. If for any reason you need to contact the Fair Hearings Division, the Telephone Number is 629-6781.

BEST AVAILABLE COPY

document with the same special meaning. If form users do not keep the same special meaning in mind throughout the form, if they do not grasp the intended cohesion then they may make errors in filling out the form.

As an example of anaphora, note the pronouns "he(she)", "your", and "their" connecting the separate items under Questions 3 and 4, referring to support from spouses. Anaphora is more common in the new "plain English" forms, in which the pronouns "we" and "you" are defined as specific parties in the beginning of the form and then occur throughout the document. Obviously, users must look for and recover the special meanings of repeated terms and the anaphoric connections if the are to understand and respond accurately on the form.

This form also displays a <u>given-new patterning</u> of information. This pattern underlies local hierarchies of items in several places on the form. For example, you see that the items in Question 5 "Income from work" (on the back of the form), are all hierarchically related: "Amount Taken Out" and "Expenses" refer to "Income from Work." "Expenses," in turn, subsumes "Transportation" and "Other." The appropriate response to "Transportation" and "Other" is only the expenses in these categories that are related to work--not just any transportation or other expenses in one's life. Many of the Medicaid recipients who were subjects in our study of this form did not observe these topical links. They answered all items as if they were independent and unconnected. Understanding the hierarchy in Question 5 requires operating under the conventions for staging

information in texts. This means seeing each label or phrase as the "new" information at the level where it is introduced, and then as the implicit "old" information for the next lower level. The hierarchy is recoverable by applying a given-new strategy.

Analyzing forms is one of the techniques that we, in the Document Design Center, are using to understand and improve public documents. We are also conducting empirical studies in which we observe performance to locate sources and types of errors, and in which we revise and test forms to incorporate more discourse level features.

Another empirical method that we are using to understand public documents involves analyzing oral protocols of subjects "thinking aloud" as they fill out forms. In the rest of this paper, we will present some very preliminary results from a protocol study of the processes and strategies used by experts and novices to fill out an application form.

Forms as discourse--processes and strategies

Analysis of thinking-aloud protocols is not a technique that has been widely used in studying discourse. In searching for strategies that readers use to understand text, researchers have generally used recall or recognition tests and then inferred what the reader is doing from the patterns of errors or intrusions. Kintsch and van Dijk (1978), for example, constructed a model of the way in which readers restructure a text to make it comprehensible.

They acknowledge that "the model does not specify the details of the processes" (p. 364).

Looking again at our model (Figure 1), you can see that the area we are interested in here is the box with the heavy border--the processes and strategies that constitute the user's behavior with the document. Traditional discourse studies only infer what might be in that box; protocol analysis allows us to peek inside. A thinking-aloud protocol is a record of the sequence of thoughts and behaviors a person engages in while performing a task. In a thinking-aloud protocol, the subject is asked to say whatever comes to mind as he or she does the task (in this case, filling out the form). The protocol is tape-recorded, transcribed, and analyzed by methods that assure objectivity and interrater reliability.

Developed by Newell and Simon (1972) to look at problem-solving, thinking-aloud protocols have also been a rich source of information on writing process (Flower & Hayes 1979, 1980, 1981). As colleagues on the Document Design Center's major project (funded by NIE), Flower and Hayes have used protocols to look at how people read and interpret Federal regulations (Flower, Hayes, & Swarts, 1980).

At AIR, we have been collecting protocols of subjects instructed to "think aloud" as they attempt to complete the Federal government's job application form--SF 171. This form ranked very high in difficulty among 54 critical documents, selected in a scientific sampling of critical and frequently used public documents. Subjects in this study vary in education, work

experience, and English language proficiency. We are particularly interested in the differences in the protocols of subjects who are successful--who complete a form that is highly likely to be well received (we call these people 'expert forms users')--and subjects who cannot complete the form or whose form is not likely to be accepted by the government service agency (we call these people 'novices' or 'inexperienced forms users'). In looking at this distinction, it is important to note that we judge novices as unlikely to be successful, not by their inherent qualifications, but by how they represent these qualifications on the form: Is it the appropriate and best representation of themselves to get a government job?

We have only begun to analyze our protocols, but it appears that the expert forms users are operating on several levels as they try to understand and complete the form--specifically, it seems that at least three levels of strategies are involved in successfully filling out this form. The chart in Figure 2 (next page) is a list of strategies we have identified from the protocols we have thus far analyzed. We have tentatively categorized these strategies into three levels, as the chart shows.

The lowest level is represented by 'decoding' statements--indicating that the user was devoting attention to the lexical and syntactic aspects of the form, attempting to figure out word meanings and to disambiguate sentences. Typical responses at this level include:

Strategies of Forms-Users

(from a preliminary protocol analysis)

I. Decoding Strategies	II. Form-using Strategies	III. Metacomments/ Reality-Testing
- lexicon - syntax	- creating examples - selecting among examples - creating scenarios - proposing definitions - calling on memory - rereading instructions - editing/reviewing/ reflecting on what is already written - being concerned about consistency	- about forms in general - about the rhetorical situation - about the way to fill out forms - about the writer's intentions

FIGURE 2

1) Subject reads the instructions to "estimate the amount of time in each type of work" and then says, "that's gonna be a problem--what is a 'type of work'?"

2) Subject reads the item heading, "lowest pay or grade you will accept," and then says, "I don't understand about grade."

At this level, we could say that the reader is in a word-bound frame.

At the second level are comments reflecting what we call "form-using strategies." These are generally text-level processes for understanding in which the user goes beyond words and sentences and attempts to relate items across the form or to draw on personal knowledge to clarify the meaning of items. Processes we have found at this level include:

1) instantiating: in deciding how to answer the question "when will you be available?" one subject commented "let's say I feel that I must have at least, must give my present employer 30 days notice. . . ." To understand the question and decide on a response, this subject conjured up a specific plausible situation.

2) calling on memory: "My discharge from the reserves. . . . Let me see if I can resurrect it."

3) watching for consistency: "[That answer] would cause me a dilemma because it sounds like I'm saying 'Yeah, I'll take a parttime job, when over here someplace I said I'm not going to take a parttime job.'"

It is at this level that we would also put the 'scenarios' that Flower, Hayes, and Swarts found in studying readers trying to understand regulations. That is, subjects trying to interpret an abstract definition or condition would try to express it as a concrete event in which someone does something (like a piece of a story). The work on scenarios shows that readers create strategies

for interpreting difficult documents by borrowing from discourse frames that are familiar and natural--here, the narrative frame.

At this second level of comments, we can say that the reader is in a form-bound frame.

Finally, we observed a third, higher-level class of statements which we call metacomments. These reflect the global strategies that arise as the reader puts the document in a societal and institutional context. The reader at this level is in a context-bound frame, looking for the intention behind the questions, predicting how answers will be interpreted, and showing awareness of the rhetorical situation and the text type. These strategies call on a very complex set of cognitive operations which involve taking the perspective of another--specifically, of the agency that produced and will make use of the returned form.

Some of the linguistic cues to these global strategies in the protocols of our forms users are:

> "I assume that if anything appears on a form it's there for a reason."
>
> "I have to stop and think and guess at what the implications [of different answers] are."
>
> "I interpret this in terms of what I think they're asking."
>
> "You're always gonna answer with what will get you the most points."
>
> "The intent of the question is . . . "
>
> "If I were applying to XXX, I would probably not put that down. If it were YYY I probably would."

These strategies clearly invoke the rhetorical setting of the document and assume a two party discourse between user and agency.

From this preliminary analysis, we believe that three levels of processing can be clearly distinguished in the protocols of expert forms users. The protocols indicate, however, that subjects move rapidly from one frame to another; clearly, the frames are interconnected. For example, subjects call on their world knowlege for the information they use in the second-level strategy of creating examples. They use the same kind of knowledge at the top level, in predicting the purposes of the agency and the criteria by which institutional decisions are made.

Differences in processes of expert and novice forms users

Of greatest interest in our preliminary results is this finding: The comments of the expert forms user are far more likely to reflect the higher two levels of strategies than are the comments of the novice forms user. Comments from novices are more likely to reflect the first level, decoding. Novices are likely to say, "I don't know my social security number" and leave the question blank. Experts will use various recall strategies or go get the card and copy down the numbers. Novices are likely to say "this word is ambiguous" and not try to disambiguate it.

Novices are far more likely than experts to make no meta-comments at all--to ignore the rhetorical situation or intent. This failure to make metacomments is reflected in other behavior. If the

expert forms users have a piece of information they think will win points, they are likely to find a place to put it down. The novice is far more constrained by the individual items on the form, leaving out potentially point-winning, personal information because "they don't ask about that."

We are speculating that the experts are successful because they have available and use these higher-level discourse strategies; and, further, that these macro-level strategies are probably essential for coping effectively with forms--at least with complicated forms like the SF 171.

Two reasons can be suggested for the finding that novices tend to respond mainly on the first level. They may be spending all of their energy in decoding, because just dealing with the words and sentences overtaxes them. As Norman and Bobrow (1975) have pointed out, humans appear to have a limited capacity central processor which distributes a finite pool of cognitive resources to ongoing mental tasks according to need. These resources may be entirely depleted by the words and sentences for poorer readers.

Of more interest to us, a second reason for failing to operate in larger frames may be that the novice forms users have not developed the appropriate strategies, or have developed them but do not apply them to forms. We hypothesize that we can take the successful strategies we uncover in our protocol analysis and teach them to the less successful forms users. Direct teaching of higher level strategies has been a successful educational practice in reading (Bartlett 1978; Jones, Monsaas, & Katims,1979).

Although our analysis of the protocols in this study is not complete, we can foresee two practical outcomes of the study: (1) We can use our results to recommend or develop instruction to teach people how to approach forms. (2) We can use our results to recommend principles for designing forms.

How might the second application work? We think that forms can be designed to facilitate the use of macro-level strategies and to exhibit more explictly the discourse features--cohesive devices, scenarios, instantiation--that we find successful forms users attending to in forms or building into their subjective structuring of forms.

For example, in the Medicaid study that we discussed earlier in this paper, many subjects not only failed to recognize some of the critical text-level variables in the form, they failed to see the form as any kind of purposive communication at all. They didn't appear to understand what a form is. We rewrote the introduction as a letter on the theory that a letter format is a more familiar communicative frame for this audience. It seemed to help.

Both the analytical work we have done and the protocol studies we are conducting show that forms can be productively studied as a type of discourse. Although the work we have reported on in this paper is barely a beginning to an understanding of forms and how people use them, we believe that this research will eventually show us how to help both those who must develop forms and those who must fill them out.

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